

## Article

# Innovating with Nature: Factors Influencing the Success of Nature-Based Enterprises

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**Abstract:** Nature-based enterprises (NBEs) have recently emerged as important actors in the delivery of nature-based solutions (NBS) to societal challenges, but little is known about the context in which they operate and the factors influencing their development. The empirical research undertaken in this study provides a first insight into the most significant barriers and enablers nature-based enterprises face in their external environment. Findings were drawn from a review of literature triangulated with a survey of 148 nature-based enterprises and interviews with the founders/CEOs of 22 NBEs. Political factors were identified as the most significant external influence, with increased awareness and incorporation of NBS into relevant policies and economic instruments seen to play a significant role in market development. Conversely, policy inconsistencies and poorly designed public procurement approaches present significant challenges. Other key influencing factors relate to financing (both public and private), lack of industry standards and impact measurement. Industry networking and access to education, training and skill development emerged as key enablers, with university collaborations highly regarded. Further in-depth research is recommended to explore indications of disparities in the levels of awareness, financing, and skills gaps across different regions of Europe and different nature-based economic activities.

**Keywords:** nature-based enterprise; nature-based economy; nature-based solutions; environmental factors; barriers and enablers



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## 1. Introduction

Nature-based enterprises (NBEs) deliver nature-based solutions (NBS) to address societal challenges. Nature-based solutions such as green spaces, parks, forests, and blue-green infrastructure generate multiple benefits—from reduced temperatures to mitigation against flooding—while simultaneously helping to increase the health and well-being of urban citizens, amongst other benefits [1]. Nature-based solutions have been widely endorsed by international policy makers, including the United Nations, IPBES, IPCC, European Commission, IUCN and the World Economic Forum [2–7], and are increasingly integrated into national and local government planning [8]. NBS capacity to create economic opportunities and green jobs is well cited in the literature [9–11], yet there is a dearth of empirical literature showing evidence of these economic benefits or green jobs or how they might be achieved [12,13].

Nature-based enterprises have been identified as critical actors in the supply chain of NBS [14,15]. Echoing and enhancing Kooijman et al. [14], we define a NBE as:

*“An enterprise, engaged in economic activity, that uses nature sustainably as a core element of their product/service offering. Here, nature may be engaged directly by growing, harnessing, harvesting, or sustainably restoring natural ecosystems, and/or indirectly by contributing to the planning, delivery or stewardship of nature-based solutions. A nature-based enterprise must contribute positively to biodiversity and ecosystem services”* [14] (p. 2) section in italics not included in original definition).

This definition has been strengthened, in line with a similar addendum to the EC definition of NBS, to clarify what is meant by the sustainable use of nature in the context of the current biodiversity crisis [4]. In the first published study [14], NBEs were found to engage in 11 categories of sustainable economic activities related to the implementation of nature-based solutions (Table 1). Of the 148 NBEs participating, most were from Europe (90%). Furthermore, the NBEs surveyed were largely small operations: 76% were micro and 22% were small enterprises (Micro enterprises have less than 10 employees (in Full-Time Equivalent) and an annual turnover or annual balance sheet total of less than 2 million Euro. Small enterprises have less than 50 employees (in Full-Time Equivalent) and an annual turnover or annual balance sheet total of less than 10 million Euro [16]).

**Table 1.** Summary of the categories of nature-based economic activities [14].

Direct Activities	Indirect Activities
<ul style="list-style-type: none"> <li>• Ecosystem creation, restoration and management</li> <li>• NBS for green buildings</li> <li>• NBS for public and urban spaces</li> <li>• NBS for water management and treatment</li> <li>• Sustainable agriculture and food production</li> <li>• Sustainable forestry and biomaterials</li> <li>• Sustainable tourism and health and well-being</li> </ul>	<ul style="list-style-type: none"> <li>• Advisory services</li> <li>• Education, research and innovation</li> <li>• Financial services</li> <li>• Smart technology, monitoring and assessment for NBS</li> </ul>

This paper develops from the initial research of Kooijman et al. [14] and provides further insights into the context in which NBEs operate. The research question asks: ‘what factors in the external environment influence the development of nature-based enterprises?’ This research will contribute deeper knowledge about NBEs and inform the development of policies and instruments to increase the economic benefits associated with nature-based solutions.

The paper is structured as follows: this introduction to the concept and definition of nature-based enterprises (NBEs) is followed by a review of relevant literature relating to their context. We first position our review of external influencing factors within the general enterprise environment (Section 2.1). Then, given the sustainability orientation of nature-based enterprises, we consider literature on external barriers and enablers influencing sustainability-oriented enterprises categorised using the PESTEL framework (Section 2.2). To complete the literature review, we consider the literature on specific barriers and enablers to the implementation of NBS which are key drivers of the establishment and growth of NBEs (Section 2.3).

Following this literature review, the methodology for this study is then presented (Section 3), followed by the findings from a survey and interviews with NBEs (Section 4). In the discussion (Section 5), we compare the barriers and enablers identified in the literature with those from empirical studies and conclude with final reflections and a synthesis of the key external factors influencing the development of nature-based enterprises (Section 6).

## 2. Literature Review—What Is Known about the Barriers and Enablers of NBEs?

### 2.1. The Enterprise Environment

Enterprise success factors and constraints—or barriers and enablers—can be divided into factors related to the internal environment, and to the external environment [17]. The internal environment is defined by entrepreneurial behaviour and factors include the founder’s characteristics, such as experience and personal motivation, and business characteristics, such as labour, capabilities, and technology [17]. As enterprises and entrepreneurs interact with the larger system context in which they operate, they are influenced by its policies, regulations, interactions, norms, societal pressures, etc. [18]. This context—or ex-

ternal environment—includes the conditions to which an enterprise must adapt to survive and thrive [19]. In the context in which an enterprise operates, three layers of influence can be distinguished: 1. the macro-environment with broad environmental factors, 2. the industry or sector with organisations offering similar products or services, and 3. direct engagement with competitors [20]. The external environment could also be defined as the macro-economic environment, with factors including business infrastructure (competitors, suppliers, banks, government, and support agencies) and customers and market segments (geography, consumption patterns, purchase behaviour, etc.) [17]. While factors in both the internal and external environment can stimulate or constrain enterprise development, internal factors are within the entrepreneur's/organisation's control, while external factors tend to be outside the entrepreneur's control [21].

A widely accepted framework for analysing external factors affecting firms in the business strategy literature is the 'PESTEL' framework. Originally proposed by Aguilar (1967) as a way of scanning the environment for conditions that might affect a firm's strategic success, this typology of relevant environmental factors has grown from the original four factors (Political, Economic, Social and Technological) to six factors, adding Ecological, Legal (see Appendix A for a description of each factor area) [22–25]. We organise the subsequent analysis under the headings of these external influencing factors affecting enterprises.

## 2.2. Factors Influencing Sustainability-Oriented Enterprises

This section reviews literature relating to ecological-sustainable enterprises [26], environmental enterprises [27,28], eco-enterprises [29], nature and forest-based enterprises [30,31], including nature-based tourism [32] and pro-biodiversity businesses that contribute to nature restoration and conservation activities [33]. In the following section these are collectively referred to as 'sustainability-oriented enterprises' and the analysis is presented under the PESTEL categories.

*Political*—Political factors enabling sustainability-oriented businesses include a supportive environment characterised by awareness and policy acceptance of the climate change crisis [28], of global goals such as the SDGs [31], and recognition of the role and value of certain sectors in addressing climate change [26]. While support from local authorities or local governments was seen as an enabling factor [32,33], literature also identified the limited ability of sustainability-oriented enterprises to engage in political activities to exert influence on public policy, e.g., information-based or expert opinion-influencing activities [26].

*Economic*—Public funding through subsidies and tax incentives was found to be an enabler for sustainability-oriented enterprises [29,32]. Even though relying on government sources alone was perceived as risky for such enterprises [26], sources of private funding for start-up capital, certification and capacity building are limited [33]. Generally, it is challenging to find investors with similar objectives, i.e., that are not driven by short-term return on investment criteria [26,27,33]. Moreover, the time needed to reach a commercially viability product can be longer than the 2–3 years that investors typically require. From the investor side, completing due diligence presented difficulties related to challenges measuring impact, thus potentially resulting in high transaction costs [27,33]. Moreover, in some cases there are limited markets for new products and services, and high levels of competition from larger, more established companies offering substitute products [27,32]. Finally, a lack of successful case studies prevents large investors from considering biodiversity business as an opportunity [33].

Industry networks and formal and informal cooperation with partners, as well as with other actors in the sector, are mentioned as enablers of market development [29–33]. For example, the exchange of information and knowledge on impact and dependency on biodiversity and ecosystem services between the business sector and conservationists was found to be good practice [33]. Lastly, another success factor is access to high-quality and relevant education—for example business schools that consider social and environmental

missions of business are more relevant to sustainability-oriented enterprises than traditional business school curricula focusing predominantly on conventional indicators of economic success [26]. Access to technical training that meets the practical needs of sustainability-oriented firms presents specific challenges, particularly in emerging fields [31].

*Social*—When considering social factors, an increase in environmental awareness in general, as well as by consumers, results in higher willingness to pay and changing consumption norms towards ‘green’ products and services [26–28,32]. For pro-biodiversity businesses, as with all businesses, there is value in being perceived as a responsible company by consumers [33]. However, in the case of pro-diversity businesses, the ability to demonstrate their credentials as a responsible business is integral to their competitive positioning. Societal support—including support from local communities—for new businesses and entrepreneurship and a long cultural tradition of utilizing resources were seen as enablers for forestry enterprises [31].

*Technical/Technological*—The knowledge and tools for measuring impact and valuation of outcomes can help businesses succeed and attract investors and customers. This could include the ability to define a biodiversity product or ecosystem services in monetary terms or to internalise the cost of public goods and service usage in business operations, such that investors can include this in risk assessments [33]. Furthermore, the presence of infrastructure, e.g., roads [29], and geographic location are important factors [32].

*Environmental*—Factors related to the environment mentioned include climate change and dependence on ecosystem services. Nature-based tourism companies with outdoor activities experienced climate change to have a potential negative effect on their business [29]. Access to and availability of natural resources is also mentioned as a factor for forest-based companies [31]. A decline in the quality and/or quantity of biodiversity and ecosystem services can negatively impact investments in this field. [33].

*Legal*—Support from local authorities or local governments are seen as an enabling factor, and measures identified include government interventions such as regulation and legislation; for example, like-for-like mechanisms requiring business to compensate for biodiversity damage [26,28,32,33]. Public policy and regulations—on both EU and national levels—could be an important driver for business by setting the goals and frameworks for sustainability criteria [31]. In addition, other factors enabling the growth of nature and forestry enterprises are clear industry standards and certification processes [32].

### 2.3. Factors Influencing the Implementation of Nature-Based Solutions

A myriad of challenges to up-scaling and out-scaling of nature-based solutions in practice have been captured in the literature.

*Political*—Endorsement of NBS at the international policy level has increased awareness at all levels of government of the multiple benefits of NBS in addressing societal challenges [8,34–36]. However, these policy commitments are not always translated into action with other literature identifying a perceived lack of urgency as regards investment in NBS [13,37]. The lack of political will to invest in NBS has been attributed to numerous factors including competing public sector priorities which are compounded by significant ‘silo’ barriers leading to a lack of NBS buy-in from other public sector depts/agencies [37,38]. The long-term nature of benefits from NBS is another barrier, rendering NBS less attractive to elected officials constrained by short-term electoral cycles and local government planning cycles [1,12,13,37]. A final challenge in the public sector environment is related to difficulties in using public procurement to implement NBS projects [39].

*Economic*—Inadequate financing of NBS implementation is one of the most commonly cited barriers to large-scale uptake [8,12,13,38,40–45]. Financing barriers identified include an over reliance on public sector funding [36,45,46] and competing priorities for land use, e.g., land needed for housing [12,38]. Currently, private sector investment in NBS is low making up only 14% of total NBS investment [36]. Commonly cited barriers to private sector investment include a lack of credible performance data in comparison with ‘grey

infrastructure' alternatives which makes return on investment prospects unclear which in turn increases the risk profile of investments.

On the positive side, the recent development of an EU Taxonomy for Sustainable Activities [47], which aims to incentivise investment into sustainable activities may enable more private sector investment in NBS. Financing to cover the long-term costs of maintaining NBS is also identified as a significant challenge [37,43]. From a broader market perspective, many policy instruments can increase demand for, and investment in NBS [15]. Three major types of economic instruments can be identified—price instruments, e.g., incentives or fees; quantity instruments, e.g., land use zoning to protect or restore natural resources; fiscal instruments, e.g., ring fencing tax income for NBS [38]. Lack of incentives or conflicting incentives can hamper uptake. Finally, looking at the supply side of the NBS market, a lack of skilled suppliers of NBS in the private sector has been identified as a barrier to implementation [39].

*Social*—While there is increased awareness of the benefits of NBS among policy makers [9], a lack of awareness among the general public has been identified as a barrier [37]. Cultural norms and public concerns around NBS need to be considered [15]. Another widely recognised barrier to NBS is the complexity of governance which requires consensus-building among multiple stakeholders [1,8,37]. Co-production of NBS with the local community and entrepreneurs is seen as critical in NBS planning, delivery and maintenance [15,41,48]. A key enabling factor for NBS is partnerships among stakeholders which in turn contributes to a more equitable distribution of the benefits of NBS and minimises negative trade-offs [8,42,45]. Collaborative governance of NBS is identified as a key success factor but presents challenges for more traditional forms of public administration [48–50]. Knowledge brokers, or intermediaries, brokeraging multi-stakeholder discussions between government and other actors have emerged as an enabler in this regard [37,50].

*Technical*—Uncertainty as regards the technical performance and cost-effectiveness of NBS as well as their resilience to climate change is perhaps the most important barrier to uptake of NBS [8,51,52]. These barriers are exacerbated by inconsistent approaches to measurement of NBS benefits and costs [1,8,13,37,53]. More recently, the UN Convention on Biological Diversity (CBD) also raised concerns about the contribution of NBS to biodiversity and the level of social inclusion in the planning of NBS (Address of Ms. Jyoti Mathur-Filipp, Director of Division CBD at 'Powering Nature' event, IUCN World Congress, Marseilles, 7 September 2021). Increased collaboration on common approaches to measuring impact may help to address this significant barrier, e.g., EC Handbook on Evaluating the impact of nature-based solutions [9,52]. Natural capital accounting and other approaches to defining service flows and monetary costs related to NBS are also being developed across multiple H2020 projects enabling actors to better capture NBS costs and benefits as part of the development of sustainable business models [42]. Given the relative novelty of the NBS concept and uncertainty around performance, lessons learned through demonstration pilots and experiments through mechanisms such as Living Labs have been identified as an enabler for NBS [13,37]. Knowledge-sharing platforms such as Oppla, NetworkNature and the Connecting Nature Enterprise Platform may also help to address technical knowledge gaps.

Finally, the application of technology to nature presents much potential to overcome barriers. From the use of geospatial data to better capture effectiveness to AI to justify public investment in NBS, new technologies from IoT to blockchain are helping to address challenges to NBS investment. Platform technologies are also emerging as a significant market enabler with the capacity to connect NBS developers with private investors [12,15,54,55].

*Environment*—The overarching drivers of demand for NBS are the climate and biodiversity crises. The benefits of NBS for climate change mitigation and adaptation; water management; coastal resilience; green space management; air quality are endorsed by multiple institutions [9]. However, as noted above, the lack of evidence of the effectiveness of NBS in combating climate change and biodiversity loss and their own resilience to climate change is a barrier [8,13,15,51].



*Legal/regulatory*—Environmental policy and regulation is generally seen as a driver for NBS than a barrier. Naturvation research [56] identified 23 EU strategies, directives and dedicated funding instruments related to supporting NBS and this support has increased in recent years [53,56,57]. More recent strategies such as the EU Biodiversity Strategy for 2030 set ambitious targets for nature protection and restoration [58]. On the other hand, a lack of specific regulation for a particular sector or fragmented/inconsistent regulation for NBS has been identified as a barrier [52].

Planning policy has a major impact on NBS. NBS planning (financing, business models, governance) is often considered as an integral part of urban planning taking into account local needs, optimal locations and scale to ensure optimal and equitable distribution of benefits [37,52,59,60]. For example, in Glasgow NBS are integrated as a core element of the Open Space Strategy (2020) informing local food growing and biodiversity strategies, planning applications and investments [61].

In conclusion, Table 2 summarises the most important barriers and enablers identified across the relevant literature. Common barriers and enablers are highlighted in bold.

**Table 2.** External factors influencing the development of sustainability-oriented enterprises and the implementation of nature-based solutions.

Factor	Summary of Factors Influencing Sustainability-Oriented Enterprises	Factors Influencing NBS Implementation/Market Demand for NBS
Political	<i>Enabler:</i> <b>Supportive political environment</b> <i>Barrier:</i> Limited access to policy makers to influence decision making	<i>Enabler:</i> <b>Strong policy endorsement of NBS</b> <i>Barrier:</i> Lack of political will and urgency to invest in NBS, silo barriers, short-term policies
Economic/ Market	<i>Enablers:</i> <b>Policy measures (subsidies, fiscal);</b> Collaboration networks, education <i>Barriers:</i> <b>Lack of financing and reliance on public financing, lack of alignment with investor interests,</b> ownership/access to natural resources, <b>technical skills gaps</b>	<i>Enablers:</i> <b>Policy measures (subsidies, fiscal)</b> <i>Barriers:</i> <b>Lack of financing and reliance on public financing,</b> public procurement challenges, <b>lack of alignment with private sector investment interests,</b> competing land use priorities; <b>lack of skilled suppliers in the private sector</b>
Social	<i>Enablers:</i> Increased general environmental awareness, <b>supportive local environment,</b> perception as responsible company	<i>Enablers:</i> <b>Co-production with local community/entrepreneurs,</b> partnerships/collaborative governance; intermediaries <i>Barriers:</i> complexity of governance, lack of general public awareness of NBS concept
Technical/ Technological	<i>Enablers:</i> Being able to <b>measure impact</b> <i>Barriers:</i> Challenge of access to infrastructure, equipment, natural resources	<i>Enablers:</i> new approaches to <b>measure impact,</b> knowledge sharing, technology, <i>Barrier:</i> uncertainty over effectiveness of NBS, inconsistent approaches to measurement
Environmental	<i>Enabler:</i> <b>Climatic changes a driver of awareness/demand</b> <i>Barrier:</i> high business risks from climatic/biodiversity changes and ecosystem loss	<i>Enabler:</i> <b>Awareness of the benefits of NBS for climate change mitigation/adaptation</b> <i>Barrier:</i> lack of evidence of effectiveness and resilience of NBS to climate change
Legal/ Regulatory	<i>Enabler:</i> <b>Government regulation and mechanisms</b> <i>Barrier:</i> Access/ownership of natural resource	<i>Enabler:</i> <b>Pro-environmental policy and regulation</b> <i>Barrier:</i> fragmented/inconsistent regulation

### 3. Methodology

This study follows a mixed-method approach combining data from a survey of nature-based enterprises with follow-up interviews to assess which of the possible barriers/enablers from the literature are relevant to NBEs.

### 3.1. Data Collection

#### 3.1.1. Enterprise Survey

The enterprise survey was undertaken from February 2020 to April 2021. It was publicly available in 13 languages and was distributed through the 11 city partners of the Horizon 2020 funded project Connecting Nature and partner networks (Connecting Nature ([www.connectingnature.eu](http://www.connectingnature.eu) accessed on 9 November 2021) is a partnership of 30 organisations co-working with local authorities, communities, industry partners, NGOs and academics for the large-scale implementation of nature-based projects in urban settings). Our aim was to reach 100 responses across a representative sample of European countries. The survey consisted of 44 questions on general enterprise characteristics, activities, value creation and on experienced barriers and enablers. This paper only considers the findings from the section on barriers and enablers thus complementing an earlier publication on general characteristics and activities [14]. The survey questions on ‘environmental factors’—external barriers and enablers—were informed by early insights from the literature. The survey was tested and adapted after several feedback rounds with six SMEs. In total, 182 responses were received from 27 countries of which 148 were deemed valid. The reasons for exclusion of responses were low data quality and level of completeness (12), lack of legal status (2) or the organisation’s activities were not nature-based (9). We also excluded organisations and enterprises delivering nature-based products and services (11)—but not as a primary business activity—as they would not qualify as nature-based enterprises [14].

#### 3.1.2. Interviews

The aim of the interviews was to validate the survey responses and to get more in-depth insights into the barriers and enablers experienced by nature-based enterprises. We conducted 22 interviews, representing 22 organisations. The interviews were semi-structured—using the original survey questions to prompt an open discussion leading to a deeper understanding of barriers and enablers. Interviews took place online (Zoom) in April 2021. The interviewees were selected to represent a cross-section of the nature-based enterprises that responded to the survey. Selection criteria included nature-based economic activities (as defined by [14]), SME status (micro and small in line with survey responses), and value orientation (for profit/not-for-profit/hybrid). We also tried to consider geographic distribution; however, our requirement to conduct the interviews in English resulted in some rejections. In summary, as shown in Appendix B, interviewees came from each of the categories of nature-based economic activities, 19 were micro and 3 were small enterprises. No medium-sized enterprises participated in this survey as they only made up 2% of survey respondents.

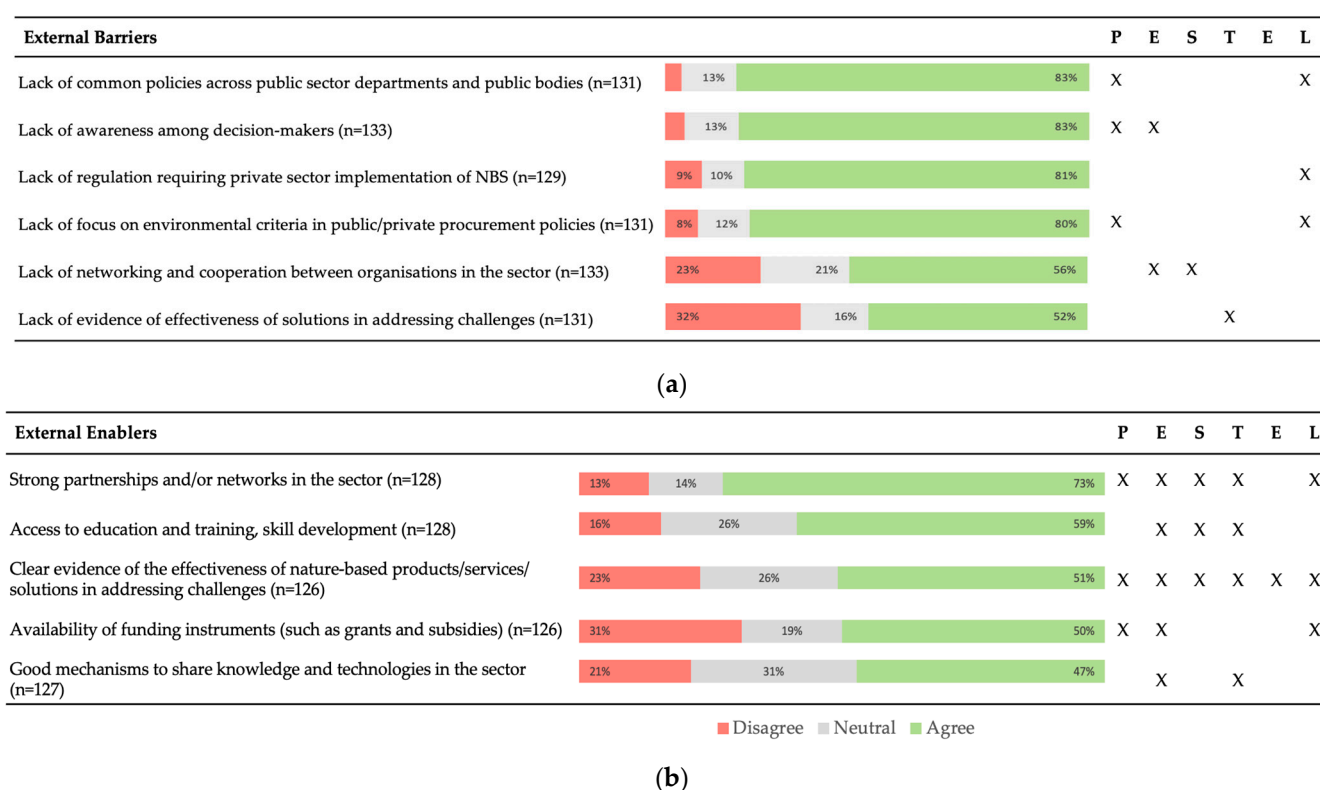
### 3.2. Data Analysis

The 148 survey results on external barriers and enablers were analysed in RStudio, and the 22 interviews were transcribed and uploaded to NVivo12, a software tool designed to facilitate qualitative data analysis. The interview transcripts were initially coded at a top level by survey headings. Following this initial analysis, a bottom-up grounded theory approach was used to analyse interview data relating to the individual barriers and enablers addressed by interviewees [62,63]. The two principal authors reviewed together the first ten manuscripts and agreed on a coding protocol. New codes were added for interview data which provided more in-depth insights on the challenges and enablers identified through literature and survey data. Additional codes were added for any insights mentioned by interviewees which were not identified in the survey or literature. Following the establishment of a clear coding protocol, the first author completed the initial round of coding. In the next stage of coding, the first and second authors again met to review themes which were emerging from the first stage of coding and to agree on how these should be grouped together and then regrouped in higher orders. This process of higher order grouping from the data led eventually to the inductive development of theory on

the most significant factors influencing NBE development [64–66]. At the end of the data analysis stage, all four authors met to review the validity of findings and to discuss implications for existing and emerging theory. The validity of findings was further tested through presentation of preliminary findings at two thematic sessions on nature-based enterprises involving other researchers and experts in the field of nature-based solutions and social innovation.

#### 4. Findings

The results of the enterprise survey and the interviews are presented together using the PESTEL framework. Figure 1a summarises the most important barriers agreed by 50% or more of interviewees. Figure 1b shows far less agreement among interviewees on enablers with only four enablers agreed by 50% or more of interviewees. These barriers and enablers often span several categories of PESTEL.



**Figure 1.** (a) External barriers faced by NBEs. (b) External enablers faced by NBEs.

##### 4.1. Political Factors

###### 4.1.1. Awareness and Knowledge

From the survey, political factors emerged as the most significant external barrier for nature-based enterprises. 83% of respondents identified a lack of awareness among decision makers and a lack of common policies across public departments and public bodies as the most important challenge faced. Interview findings revealed a more nuanced perspective. On the one hand, interviewees pointed to an increased awareness of NBS within the public sector. However, they indicated that this was offset by a lack of detailed understanding of NBS in practice. This was illustrated with examples relating to the cost structure of nature-based solutions. ‘Pots of money’ were seen as more available for delivery rather than maintenance or monitoring of nature-based solutions.

*“The Department of Urban Forestry might be responsible for planting the trees and they might get capital investment to plant those trees. But then the money for aftercare and monitoring comes from somewhere else. There’s a huge lack of ownership”.* (I21)



Furthermore, interviewees indicated that significant knowledge gaps exist around the multi-functionality of nature-based solutions, with the public sector tending to focus on one specific aspect of a nature-based solution—usually either environmental or social rather than take a holistic approach across multiple departments. Potential economic benefits related to nature-based entrepreneurship were identified as a highly novel concept.

#### 4.1.2. Silo Gaps

Interviews provided further insights on how a perceived lack of common policies for NBS in the public sector acted as a barrier. Echoing the literature on silos in the public sector, interviewees reported frustration in the lack of an integrated approach to nature-based solution planning and delivery across public sector departments.

*“You have the planning authority, who does this work here, we have the environment authorities, you have another authority, which is focusing on tourism, which does some environmental work, you have transport, which is a key player and you have experts who are all in these fields, who are doing similar things, sometimes even competing with each other, and we’re trying to bring these people together, but their priorities are different”.* (I16)

### 4.2. Economic Factors

#### 4.2.1. Financing

Lack of funding/support in the public and private sector for novel NBS approaches was identified as a significant barrier by 73% of NBE respondents. Further insights from interviews revealed that this was often related to a lack of awareness and understanding of the cost structure of NBS, the multi-functional benefits of NBS and the difficulties measuring effectiveness as addressed previously leading to difficulties constructing compelling business cases. Other barriers included a perceived reluctance of the public sector to commit to large-scale, longer-term investments. Interviewees pointed out that this risk aversion to innovative solutions means that it sometimes takes years before a new approach is adopted at scale. The public sector tends to roll out smaller pilots and gradually scale up innovative solutions whereas with nature-based solutions, NBEs point out that scale is often needed from the outset to achieve impact. The longer timeframe required for return on investment in NBS does not correspond well with short-term political cycles.

The findings on funding and support for NBS in the private sector were mixed. Some nature-based enterprises reported an increased general awareness of environmental issues in the corporate sector. Despite a growing interest in instruments such as carbon credit schemes, NBEs perceived that corporations lacked the knowledge to compare the impacts from tree planting with more complex but potentially more impactful solutions such as rewilding. Other nature-based enterprises reported a substantial increase in enquiries from corporates and developers in relation to solutions such as green facades. The level of awareness seems quite superficial, however, with a low conversion rate from enquiries to sales. Similar to the public sector, nature-based enterprises attribute this to a lack of understanding of the cost structure of an NBS and the need to plan for long-term maintenance costs. The availability of funding instruments such as grants and subsidies was recognised as an enabler by 50% of survey respondents. Interviews confirmed the important role of such interventions in market development.

Interestingly, in interviews with nature-based enterprises there was more of an emphasis on lack of financing of NBS rather than a lack of financing for nature-based enterprises themselves. For most enterprises, ongoing financing was secured through commercial project activity—with a preference clearly expressed for clients in the private sector. Some NBEs reported difficulties in financing but primarily due to their small size or a lack of market awareness. Two other challenges emerged as specifically related to working capital. The first is the project-to-project nature of the industry and the second is the long production times associated with some types of direct activity, i.e., growing, harnessing, harvesting or restoring natural resources. A good example is sustainable forestry:

*“You have to have a lot of capital to be able to buy wood and dry it, and then there’s a whole process. And it’s capital that is blocked for years on end”. (I10)*

Many interviewees expressed a wariness of financial institutions—some were concerned that banks simply would not understand their business while others were concerned about getting into debt given the project-by-project nature of their sector. Interestingly those who did approach banks seemed to be generally successful in securing loans or lines of credit. Usually, they tried not to use them, preferring to rely on other ‘cheaper’ sources of financing—such as impact investors or concessional financing. In some countries such as Germany, a growing awareness that ‘green sells’ has opened up doors for nature-based enterprises with financial institutions and investors.

#### 4.2.2. Procurement Barriers

A significant barrier that emerged from primary research relates to procurement. 80% of survey respondents agreed that there was a lack of focus on environmental criteria in public/private procurement policies. Interview data provided further insights, suggesting firstly, that public rather than private procurement policies and practices present the most significant challenges. While some barriers such as high levels of bureaucracy in public procurement are well-known and common complaints of many SMEs from all sectors, other challenges are more specific to nature-based solutions. There was a broad consensus that public procurement criteria tend to be too narrowly focused on financial criteria and do not adequately take into account the multiple co-benefits of nature-based solutions. Public procurement policy decisions clearly affect market potential.

Furthermore, NBEs report that public procurement procedures are not designed for nature-based solutions which require considerable pre-delivery services related to stakeholder engagement and post-delivery services such as monitoring and stewardship. Combining these challenges several interviewees expressed a reluctance to bid for public contracts expressing a preference for private sector contracts due to faster decision making timeframes and less bureaucracy. Other interviewees remarked on the lack of competition for public tenders.

#### 4.2.3. Business Support Structures

The experience of nature-based enterprises relating to business support structures was mixed. Several interviewees reported a lack of alignment on success criteria with business support structures prioritising economic performance indicators such as revenue or job creation over environmental or social impact. Social enterprise networks were identified as helpful for some businesses providing reassurances of mission focus and helping to identify potential scaling models. Most nature-based enterprises interviewed had some experience of ‘soft’ supports such as mentoring or business accelerator programmes. Many found this quite useful as a reflexive tool to focus on strategic issues as opposed to day-to-day operational challenges. Mentors were identified as useful in the area of general business development rather than in the technical field. Universities were perceived as essential partners for nature-based enterprises providing credibility for nature-based solutions:

*“From my point of view, it’s a reputation we developed through our research and development activities together with universities. I think that helps us in selling our products, and people, all local governments, take it seriously. There’s a lot of trust being built out of that”. (I7)*

Overall, strong industry partnerships and/or networks in the NBS sector were identified as the most significant business support enabler, with 73% agreement from survey respondents.

#### 4.2.4. Access to Education, Training, Skill Development

A total of 59% of survey respondents agreed on the importance of access to education, training and skills development, making it the second most important enabler identified.

47% of respondents also agreed that good mechanisms to share knowledge and technologies in the sector were important. As nature-based solutions are highly context specific nature-based enterprises emphasised the importance of finding or developing expertise on the ground at the local level for practical delivery, management and stewardship of NBS projects.

#### 4.3. Social Factors

##### General Awareness of NBS

Levels of environmental awareness among the general public were more often identified as an enabler than a barrier by NBEs. The COVID 19 pandemic and subsequent lockdowns increased awareness of the importance of access to nature for health and well-being. Many nature-based enterprises reported a high level of media and public interest in their nature-based activities.

*“What’s really enabling has just been the public’s understanding of the environment. So our members, they’re all super hungry to learn more about you know, mitigating climate change, rewilding nature, restoration”.* (I9)

Levels of awareness varied, however, across different types of NBS and geographical areas. For example, in the UK, nature-based therapies are well known and integrated into the health system, whereas they are virtually unknown and unsupported by the health system in Ireland (4). In Germany, the market for green infrastructure is maturing rapidly whereas in Slovenia it appears to be in its infancy. Awareness levels may be considered also as an economic factor as they affect the growth potential of companies.

#### 4.4. Technical/Technological Factors

##### 4.4.1. Evidence of NBS Effectiveness

Capacity gaps relating to measuring NBS impact could also be perceived as a technical factor. Survey respondents appeared divided on the question of NBS effectiveness—52% of survey respondents identified the lack of evidence of effectiveness of NBS as a barrier while 51% also perceived clear evidence of the effectiveness of NBS as an enabler. Interview findings provided some clarity on this issue with most interviewees agreeing that there was a lack of formal scientific research measuring the impacts of NBS and therefore a lack of knowledge about effectiveness of NBS.

*“We were winning awards for biodiversity, for instance, for our building. . . But to be honest, we don’t know whether this is good for biodiversity. . . because we’ve had no formal research done”.* (I5)

Without credible and generally accepted evidence of effectiveness, NBEs identified that it was more challenging to build a business case for NBS as they were relying on anecdotal, informal evidence rather than scientific data.

##### 4.4.2. Smart Technologies and Platforms

Smart technologies for NBS are an important emerging enabler. Enterprises involved in this sector point to their potential for education and awareness raising, to address barriers related to impact measurement through application of smart sensors, IoT and satellite technologies and from a market potential the increasing importance of platform technologies in connecting buyers with suppliers of NBS.

#### 4.5. Environmental Factors

As discussed under political and social factors, increased awareness of climate and biodiversity crises was widely considered by nature-based enterprises to be a driver of increased interest in, and demand for NBS. There was little discussion of environmental factors as a barrier to development.

#### 4.6. Legal/Regulatory Factors

##### 4.6.1. Regulation

There is some overlap between legal and regulatory factors and other factors such as political or economic factors. The importance of international agreements such as the Paris Agreement in setting climate change targets has significantly influenced national and local policies and provided the framework for a myriad of policy, planning and regulatory instruments. As already discussed, many of these policies and instruments have been identified as enablers for NBS. One area not already discussed where there was strong agreement among survey respondents (81%) was the lack of regulation requiring private sector implementation of NBS. This finding was supported by interview data where NBEs related a lack of private sector regulation to inconsistent policies on NBS as discussed previously. There was general agreement that more regulation of the private sector and developers to integrate nature-based solutions into their processes was desirable and relevant policy measures need to be introduced to encourage such behaviour.

##### 4.6.2. Industry Standards

Nature-based enterprises raised the subject of industry regulation and the need for industry standards to be developed for practitioners as the market for nature-based solutions grows and becomes more attractive to new entrants. In some sectors such as nature-based therapies for health and well-being, interviewees pointed out that a lack of industry standards could result in serious negative impacts for end-users and create reputational damage for practitioners. In other industry sectors such as green infrastructure, practitioners advocated for standards relating to criteria such as long-term sustainability and adherence to short circular economy practices for material sourcing.

The complexity of developing industry standards for nature-based solutions was recognised by practitioners. Raising awareness of industry standards among buyers of nature-based solutions was identified as an important first step. Increased awareness and adoption of the principles for implementing nature-based solutions set out in the IUCN Global Standard (2020) may help to address some of these challenges [67].

Table 3 summarises the findings from primary research and literature on key external factors influencing the development of nature-based enterprises.

**Table 3.** External factors influencing the development of nature-based enterprises.

Factor	Primary Research Findings (Survey and Interviews)	Identified in SOE Literature	Identified in NBS Literature
Political	<b>Enablers:</b>		
	<ul style="list-style-type: none"> <li>Increased awareness/policy support in general</li> </ul>	X	X
	<b>Barriers:</b>		
	<ul style="list-style-type: none"> <li>Lack of in-depth understanding of NBS in public sector</li> <li>Lack of consistent policies /silo gaps</li> </ul>	/	X
Economic/ Market	<b>Enablers:</b>		
	<ul style="list-style-type: none"> <li>Economic support instruments, e.g., grants and subsidies</li> </ul>	X	X
	<ul style="list-style-type: none"> <li>Strong financial institution/investor interest in NBEs</li> </ul>	/	/
	<ul style="list-style-type: none"> <li>Industry networks, platforms, university collaborations</li> </ul>	X	/
	<ul style="list-style-type: none"> <li>Access to education, training, skill development</li> </ul>	X	/
	<b>Barriers:</b>		
	<ul style="list-style-type: none"> <li>Challenges to public/private sector financing;</li> </ul>	X	X
	<ul style="list-style-type: none"> <li>Low interest/alignment of NBEs in institutional/private investment</li> </ul>	X	/
	<ul style="list-style-type: none"> <li>Public procurement policies impacting market growth</li> </ul>	/	X
	<ul style="list-style-type: none"> <li>Lack of alignment of business support structures to KPIs</li> </ul>	/	/

Table 3. Cont.

Factor	Primary Research Findings (Survey and Interviews)	Identified in SOE Literature	Identified in NBS Literature
Social	<b>Enablers:</b>		
	<ul style="list-style-type: none"> <li>Increased public/media interest in nature and climate change</li> </ul>	X	X
	<b>Barriers:</b>		
	<ul style="list-style-type: none"> <li>Disparity in levels of awareness across countries and NBE market sectors</li> </ul>	/	/
Technical/ Technological	<b>Enablers:</b>		
	<ul style="list-style-type: none"> <li>Smart technologies and platform technologies</li> </ul>	/	X
	<b>Barrier:</b>		
	<ul style="list-style-type: none"> <li>Lack of knowledge/technology to measure impact</li> <li>Lack of evidence of effectiveness</li> </ul>	/	X
Environmental	<b>Enabler:</b>		
	<ul style="list-style-type: none"> <li>Increased awareness of climate and biodiversity crises</li> </ul>	X	X
Legal/ Regulatory	<b>Enabler:</b>		
	<ul style="list-style-type: none"> <li>Pro-environmental policies, planning and regulatory instruments</li> </ul>	X	X
	<b>Barrier:</b>		
	<ul style="list-style-type: none"> <li>Inconsistent regulation</li> <li>Regulation requiring private sector adoption of NBS</li> <li>Lack of industry standards</li> </ul>	/	X

## 5. Discussion

In this discussion, we combine findings from the literature with those from primary research to draw out commonalities and divergences on key external factors influencing nature-based enterprise development. We conclude with a synthesis of the most significant barriers and enablers and consider further directions for policy and research based on these findings.

In this study, nature-based enterprises identify political and regulatory factors (awareness of NBS levels among policy makers, policies and regulations enabling/limiting NBS uptake) as the most significant external factors influencing demand for NBS. This in turn directly impacts their own development. This finding is broadly supported by literature which shows an increased political awareness of climate and biodiversity crises and the role of NBS in addressing these crises. However, despite top level policy endorsement of NBS as found in the literature, the findings on the ground from this research reveal significant residual knowledge gaps at an operational level concerning NBS implementation, a lack of coordination and inconsistent policy approaches across public sector departments/agencies, and a myriad of challenges related to public procurement which are stymying market development. While many of these challenges are well documented in NBS literature, the findings on public procurement are less so and shed new light on earlier research [39], which suggests a low number of bids on NBS contracts is related to a shortage of skilled and experienced suppliers of nature-based solutions. Another explanation emerges from this study which suggests that public sector contracts are unattractive to nature-based enterprises because existing procurement processes and selection criteria are not well suited to the complexities of NBS. In this context, it is worth considering other findings from the literature which suggest that sustainability-oriented enterprises lack access to influence policy makers and policy decisions [26]. Given the wide acceptance in NBS literature of the importance of a multi-stakeholder, collaborative approach to NBS planning and implementation [13,48], it may be worth considering to what extent better access of NBEs to policy makers and increased engagement of NBEs in policy development may help to address some of these public procurement barriers.



Economic factors (factors influencing market development, financing and investment in NBS/NBEs, industry development) were also found to be highly influential. There was some overlap between political and economic factors in both the literature and in primary research. Economic instruments such as subsidies or fees were found to have an important positive impact on market development and private sector investment in NBS. Lack of financing for NBS was a major barrier identified in both primary research and literature. A somewhat surprising finding was that NBEs perceived the aversion to risk related to NBS to be the same in both the public and private sector. While it is often suggested that the public sector is more risk averse than the private sector, in relation to NBS this does not seem to be the case [68,69]. It is possible that lower levels of risk aversion in the public sector may be due to the high level of awareness raising activity around NBS at the public policy level. There is little evidence of similar awareness raising efforts targeting the private sector which may explain a lower level of awareness about NBS and a higher aversion to risk.

Looking more specifically at the financing of nature-based enterprises, when compared with the literature on other types of sustainability-oriented enterprises, lack of financing and dependence on public sector funding does not appear to be as significant a barrier for nature-based enterprises. Most interviewees reported as self-financed through commercial contracts and are not reliant on concessional financing. NBEs did, however, share with other types of sustainability-oriented enterprises a lack of understanding of financial instruments and a concern over potential lack of mission alignment with investor and institutional interests [26,27,33]. This is consistent with recent research on third sector organisations which identify a 'lack of fit' between such organisations and impact investment due to poor investment fit (too short term), risk aversion and value incompatibility [70]. Such barriers may provide food for thought in the development of financial instruments to stimulate investment in natural capital and nature-based solutions.

This lack of alignment also extended to business supports which were in some cases perceived to be more focused on conventional economic impact indicators than environmental or social impact indicators. Lack of understanding of NBE drivers in the wider business and investment community may be one of the reasons why nature-based enterprises found networking with like-minded entities so important. The critical importance of networking as an enabler was echoed in the literature where formal and informal collaborations were identified as a key success factor for sustainability-oriented enterprises [30–33].

From a socio-economic perspective, important influencing factors on NBE development identified across literature and primary research included increased levels of public awareness of environmental issues and the availability of education, skill and training for NBEs. Primary research revealed significant gaps in awareness about NBS across different European countries and across different NBE sectors which warrant further investigation.

Regarding technical/technology barriers, there was much convergence between barriers and enablers in NBS literature and primary research. Lack of evidence of the effectiveness of NBS remains a major stumbling block which is compounded by a lack of knowledge on how to measure the multiple impacts of NBS. There is some evidence of progress in this field with new EC guidelines emerging this year but there appears to be little knowledge and implementation of these guidelines in NBE practice yet. Smart technologies for NBS hold much potential to address impact measurement challenges. This could present considerable growth opportunities for NBEs operating in this market sector in the future.

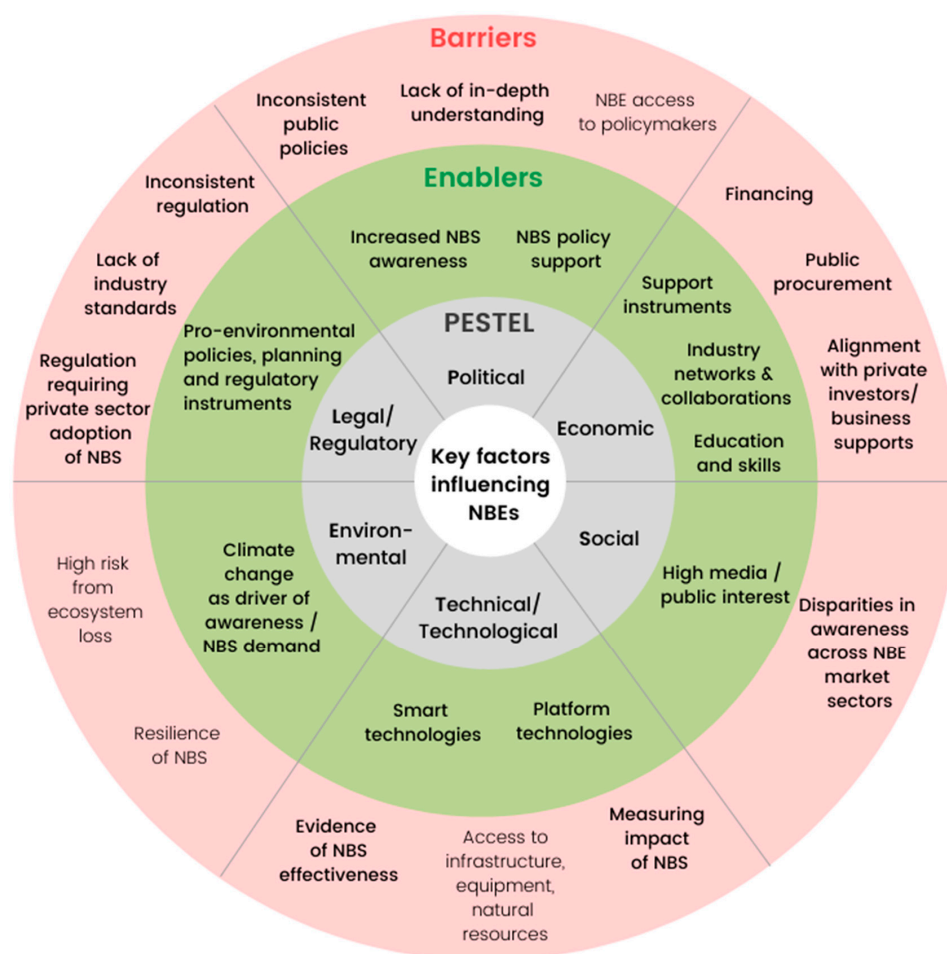
Nature-based enterprises did not report the same level of challenges in accessing infrastructure, equipment, and natural resources as other types of sustainability-oriented enterprises. Anecdotal evidence from more recent NBE support programmes indicates, however, that this could indeed be a major challenge and therefore warrants further investigation with a larger sample size. (Findings from the NBEs participating in the Glasgow NBE Accelerator Programme (2021) indicated access to land and natural resources was a significant challenge. This accelerator was a joint collaboration between Glasgow Caledonian

University, Glasgow City Council and local social enterprise The Melting Pot and supported by the Horizon 2020 project Connecting Nature <https://www.gcu.ac.uk/theuniversity/universitynews/2021-nature-basedaccelerator/> (accessed on 9 November 2021)).

In relation to the environment, the findings of the literature review and primary research did not reveal significant new knowledge. Increased environmental awareness is a major driver of NBS as addressed in relation to policy and market factors. NBE interviewees, in particular those involved in direct nature-based activities, did not strongly identify with the risk of negative impacts to their business from climate change and biodiversity loss. Indeed, their business model may be dependent on it! In contrast, this risk was clearly identified in the literature on sustainability-oriented enterprises [32,33]. Furthermore, NBE interviewees did not identify as a significant risk a lack of knowledge on the resilience of NBS to climate change [8].

Finally, in relation to legal factors, there was again some overlap with other factors including policy, planning and regulatory instruments which were identified as the most significant influence on market development for NBEs. A lack of regulation encouraging NBS take-up in the private sector was a significant finding from primary research which was not well addressed in the literature. The importance of standards also emerged strongly from primary research, a sign of maturing innovation levels across an industry sector [71].

The most significant external influences on nature-based enterprises identified in this study are synthesised in Figure 2.



**Figure 2.** Key factors influencing Nature-Based Enterprises (NBEs). Influencing factors highlighted in bold were identified in the literature, surveys and interviews. Factors not highlighted in bold were only identified in the literature.

## 6. Conclusions, Limitations, and Further Research Directions

### 6.1. Limitations

As with all studies, several important limitations must be acknowledged. Firstly, a systematic literature review, while beyond the scope of this publication, may have yielded some additional insights. Secondly, regarding the survey, the reliance on self-assessment may have led to different interpretations of barriers and enablers than was intended. This was somewhat addressed through the follow up interviews. A more important limitation was the relatively small sample size, and the geographic focus on Europe. Interviews did suggest important disparities across NBS sectors and types of NBS which would suggest further empirical studies are warranted. The objectivity of the data analysis and interpretation of findings is also subjective, in particular as regards assignment to specific PESTEL categories. This was addressed through the involvement of multiple authors in coding and development of theory to increase validity and consistency. Notwithstanding these limitations, we believe that the literature, empirical data and findings presented in this study represent an initial synthesis of the significant barriers and enablers facing nature-based enterprises and provide a solid foundation from which to advance the understanding of nature-based enterprises and the contexts in which they operate.

### 6.2. Future Research Directions

Much of the literature pertaining to nature-based solutions is found in the field of urban studies or climate sciences. As the concept of nature-based enterprises is at a nascent stage of theory development there are many fruitful directions for future research and the application of knowledge from the fields of entrepreneurship, business, development studies and environmental economics to name but a few. Such studies have the potential to make a significant contribution to future economic policies and practices within the context of a transitioning society and economy.

The limitations of this research in terms of sample size and geographical reach suggest further larger-scale empirical studies are warranted to validate the findings of this initial research. Further research studies by market sector and/or geographical region would be particularly helpful.

While this study looked at external factors influencing development, additional research considering internal organisational barriers and developing deeper insights on skill and capacity gaps would provide considerable complementarity. Initial indications from this study suggest evidence of different types of skills gaps. Many nature-based enterprises, for example, report that they have strong technical/ecological skills but relatively poor business and communication skills. NBEs report difficulties recruiting staff with multidisciplinary skill sets which may contribute to a lack of capacity for business development. The second major gap relates to NBE capacities to measure the effectiveness or impact of nature-based solutions. This is an area where nature-based enterprises identified further research and development was required. Important disparities also emerged across countries and NBE sectors as regards skill and capacity gaps. While the sample size in this study was too small to be conclusive, further empirical research on knowledge gaps with a more representative sample size across different European countries would be helpful to better understand disparities and contribute to better formulation of policy responses.

Another interesting direction for future research would be in the field of mission orientation. This study suggested a lack of goal alignment between the mission orientation of NBEs and other key actors such as economic policy makers, financial institutions and investors. Further studies providing a deeper understanding of these misalignment and the implications for scaling and impact would be useful.

Finally, this study considered nature-based enterprise as the primary unit of analysis. Little is known about the motivations of the nature-based entrepreneurs founding and driving such enterprises or their entrepreneurial journeys from start-up to scaling. Applying knowledge from the field of entrepreneurship to this new field of practice could result

in a substantial contribution in both theory and policy development to support future generations of NBEs.

### 6.3. Conclusion

Nature-based enterprises have recently emerged as important actors in the delivery of nature-based solutions but little is known about the context in which they operate and the factors influencing their development. The empirical research undertaken in this study provides a first insight into the most significant barriers and enablers nature-based enterprises face in their external environment.

The findings of this study show that politicians and policy makers at the national and local government levels can play a pivotal role in addressing many of the barriers identified by nature-based enterprises, from addressing knowledge gaps and inconsistencies in public sector approaches, to putting in place the policy instruments to stimulate NBs market demand and private sector investment.

In conclusion, Europe has shown a clear commitment in policy and research to nature-based solutions to societal challenges. NBS are an important component of vital strategies for the future health of Europe's people and environment from the Biodiversity Strategy 2030 to the Green Deal. Further research is urgently needed on the potential of nature-based enterprises (NBEs) to help deliver the large-scale implementation of NBS.

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## Appendix A. PESTEL Categories

	Sammut-Bonnici and Galea [23]	Jurevicius, O. [24]	CIPD [25]
Political	<ul style="list-style-type: none"> <li>Government policies</li> <li>Government term and change</li> <li>Trading policies</li> <li>Local legislation, current and future</li> <li>International legislation</li> <li>Regulatory bodies and processes</li> <li>Funding, grants and initiatives</li> <li>Lobbying and pressure groups</li> <li>Fiscal policy</li> <li>National incentives for enterprise</li> <li>Planning, permits, licensing</li> <li>Transparency and control of corruption</li> <li>Government policy on supporting specific industries</li> </ul>	<ul style="list-style-type: none"> <li>Government stability and likely changes</li> <li>Bureaucracy</li> <li>Corruption level</li> <li>Tax policy (rates and incentives)</li> <li>Freedom of press</li> <li>Regulation/de-regulation</li> <li>Trade control</li> <li>Import restrictions (quality and quantity)</li> <li>Tariffs</li> <li>Competition regulation</li> <li>Government involvement in trade unions and agreements</li> <li>Environmental Law</li> <li>Education Law</li> <li>Anti-trust law</li> <li>Discrimination law</li> <li>Copyright, patents/IP law</li> <li>Consumer protection e-commerce</li> <li>Employment law</li> <li>Health and safety law</li> <li>Data protection law</li> <li>Laws regulating environment pollution</li> </ul>	<ul style="list-style-type: none"> <li>Tax policy;</li> <li>Environmental regulations;</li> <li>Trade restrictions and reform;</li> <li>Tariffs;</li> <li>Political stability</li> </ul>
Economic	<ul style="list-style-type: none"> <li>Local economy</li> <li>International economy</li> <li>Economic trends, inflation</li> <li>Corporate taxation</li> <li>Product taxation and duties</li> <li>Seasonality of economic cycles</li> <li>Market and trade cycles</li> <li>Channels of distributions and access to markets</li> <li>GDP, consumer purchasing power</li> <li>Interest and exchange rates</li> </ul>	<ul style="list-style-type: none"> <li>Growth rates</li> <li>Inflation rate</li> <li>Interest rates</li> <li>Exchange rates</li> <li>Unemployment trends</li> <li>Labor costs</li> <li>Stage of business cycle</li> <li>Credit availability</li> <li>Trade flows and patterns</li> <li>Level of consumers' disposable income</li> <li>Monetary policies</li> <li>Fiscal policies</li> <li>Price fluctuations</li> <li>Stock market trends</li> <li>Weather</li> <li>Climate change</li> </ul>	<ul style="list-style-type: none"> <li>Economic growth/decline;</li> <li>Interest;</li> <li>Exchange;</li> <li>Inflation and wage rates;</li> <li>Minimum wage;</li> <li>Working hours;</li> <li>Unemployment (local and national);</li> <li>Credit availability;</li> <li>Cost of living</li> </ul>



	Sammut-Bonnici and Galea [23]	Jurevicius, O. [24]	CIPD [25]
Sociological/ Sociocultural	<ul style="list-style-type: none"> <li>• Demographics</li> <li>• Psychographics and lifestyle</li> <li>• Consumer perception of brands, products</li> <li>• Consumer purchasing behavior</li> <li>• Effect of advertising and public relations</li> <li>• Influencers, role models</li> <li>• Racial, ethnic, religious influences</li> </ul>	<ul style="list-style-type: none"> <li>• Health consciousness</li> <li>• Education level</li> <li>• Attitudes toward imported goods and services</li> <li>• Attitudes toward work, leisure, career and retirement</li> <li>• Attitudes toward product quality and customer service</li> <li>• Attitudes toward saving and investing</li> <li>• Emphasis on safety</li> <li>• Lifestyles</li> <li>• Buying habits</li> <li>• Religion and beliefs</li> <li>• Attitudes toward “green” or ecological products</li> <li>• Attitudes toward and support for renewable energy</li> <li>• Population growth rate</li> <li>• Immigration and emigration rates</li> <li>• Age distribution and life expectancy rates</li> <li>• Sex distribution</li> <li>• Average disposable income level</li> <li>• Social classes</li> <li>• Family size and structure</li> <li>• Minorities</li> </ul>	<ul style="list-style-type: none"> <li>• Cultural norms and expectations;</li> <li>• Health Consciousness;</li> <li>• Population growth rates;</li> <li>• Age distribution;</li> <li>• Career attitudes;</li> <li>• Health and safety</li> </ul>
Technological	<ul style="list-style-type: none"> <li>• New materials, machinery, software and business process support</li> <li>• Innovations in electronic processes</li> <li>• Innovations in mechanical processes</li> <li>• Innovation in product design</li> <li>• New distribution channels</li> <li>• Innovations in pricing</li> <li>• Effect of technology on product design, production, distribution, pricing and consumption</li> </ul>	<ul style="list-style-type: none"> <li>• Basic infrastructure level</li> <li>• Rate of technological change</li> <li>• Spending on research and development</li> <li>• Technology incentives</li> <li>• Legislation regarding technology</li> <li>• Technology level in your industry</li> <li>• Communication infrastructure</li> <li>• Access to newest technology</li> <li>• Internet infrastructure and penetration</li> </ul>	<ul style="list-style-type: none"> <li>• New technologies are continually emerging (for example, in the fields of robotics and artificial intelligence)</li> </ul>
Environmental		<ul style="list-style-type: none"> <li>• Weather</li> <li>• Climate change</li> <li>• Laws regulating environment pollution</li> <li>• Air and water pollution</li> <li>• Recycling</li> <li>• Waste management</li> <li>• Attitudes toward “green” or ecological products</li> <li>• Endangered species</li> <li>• Attitudes toward and support for renewable energy</li> </ul>	<ul style="list-style-type: none"> <li>• Global warming and the increased need to switch to sustainable resources;</li> <li>• Ethical sourcing (both locally and nationally), including supply chain intelligence.</li> <li>• Pandemics and other emergencies.</li> </ul>

	Sammut-Bonnici and Galea [23]	Jurevicius, O. [24]	CIPD [25]
Legal		<ul style="list-style-type: none"> <li>• Anti-trust law</li> <li>• Discrimination law</li> <li>• Copyright, patents/IP law</li> <li>• Consumer protection/e-commerce</li> <li>• Employment law</li> <li>• Health and safety law</li> <li>• Data Protection</li> </ul>	<ul style="list-style-type: none"> <li>• Changes to legislation impacting employment</li> <li>• Access to materials</li> <li>• Quotas</li> <li>• Imports/exports,</li> <li>• Taxation</li> </ul>

### Appendix B

**ES** = ecosystem creation, restoration and management; **GB** = NBS for green buildings; **PS** = NBS for public and urban spaces; **WM** = NBS for water management; **AF** = Sustainable agriculture and food production; **FB** = Sustainable forestry and biomaterials; **ST** = Sustainable tourism; **HW** = NBS for health and well-being; **AS** = Advisory services; **ER** = Education, research and innovation; **FS** = Financial services; **TM** = Smart technology, monitoring and assessment for NBS.

Code	Economic Activity											Country	Year Founded	Legal Status	Size	Position of Interviewee	Description of Activities
	ES	GB	PS	WMAF	FB	ST	HW	AS	ER	FS	TM						
I1												Denmark	2015	Limited company	Micro	Founder, CEO	Design/deliver interactive digital learning material on UN SDGs. Gamification.
I2												Ireland	2018	Limited company	Micro	Founder, Director	Ecological activism through multi-disciplinary science, technology, people initiatives
I3												United Kingdom	2016	Limited company	Micro	Founder, Director	Sustainable, regenerative tourism committed to community and conservation
I4												Ireland	2019	Limited company	Micro	Founder, Director	Nature-based interventions for positive mental health. Forest bathing and therapy
I5												United Kingdom	2009	Limited company	Micro	Co-founder, Director	Design and delivery of green/ecological structures supporting biodiversity
I6												Netherlands	2018	Limited company, Foundation	Small	Founder, CEO	Regenerative agriculture
I7												Germany	2005	Limited company	Micro	Joint CEO	Living green roofs, walls and installations
I8												Slovenia	1953	Research institutes	Small	Head of Research	Research and guidance on urban planning and spatial development
I9												United Kingdom	2017	Limited company	Micro	Co-founder	Rewilding and reforestation projects—design/delivery
I10												Belgium	2019	Co-operative	Micro	Founder, CEO	Sustainable forestry co-operative using local wood for bespoke wood products
I11												United Kingdom	2002	Charity	Micro	CEO	Guidance on resourcing, managing and ensuring equitable access to quality green space
I12												France	2001	Limited company	Micro	Director	Restoration and optimisation of marine ecosystems globally
I13												Netherlands	2015	Not for profit Foundation	Micro	Co-founder, Director	Design and development studio fostering sustainable transitions

Code	Economic Activity											Country	Year Founded	Legal Status	Size	Position of Interviewee	Description of Activities
	ES	GB	PS	WMAF	FB	ST	HW	AS	ER	FS	TM						
I14												Netherlands	2013	Sole trader	Micro	Founder, Director	Consultancy on new business/financing models for NBS, sustainable land use
I15												Ireland	1996	Limited Company	Micro	Director, Founder	Education, design and planting constructed wetland systems for wastewater treatment
I16												Malta	2019	Limited Company	Micro	Co-founder, Director	Environmental consultancy
I17												United Kingdom	2001	Research Institute	Small	Director	Research, consultancy on sustainable landscape management
I18												Spain	2005	Not for profit Foundation	Micro	President	Generation of free access collective knowledge through critical and creative research
I19												Ireland	2016	Sole trader	Micro	Founder, CEO	Nature-based landscape architect
I20												Netherlands	2018	Limited company	Micro	Founder, CEO	Uses geospatial intelligence and artificial intelligence techniques to map monitor and improve urban forests
I21												Netherlands	2018	Limited company	Micro	Strategic partnerships/ business developer	Use of sensor technology to improve soil and growing conditions for urban trees
I22												Slovenia	2005	Limited company	Micro	Co-founder, CEO	Zero-waste, locally produced sustainable furniture

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